REMARKS

In the above-identified Office Action, the Examiner has rejected claims 1-9 and 22-23 as failing to comply with the written description requirement. Further, claims 22-23 have been rejected under 35 USC Section 112 as also failing to comply with a written description requirement. Claim 1-18, 20 and 22-23 have been cancelled, thereby obviating these rejections.

Claims 1-9 have also been rejected under 35 USC Section 112 as indefinite. Applicant, as stated above, has cancelled claims 1-9 and, accordingly, this rejection is considered obviated.

Finally, claims 1-9 and 22-23 have been rejected under 35 USC Section 112 as indefinite. As stated above, claims 1-9 and 22- 23 have been cancelled; accordingly, this rejection is considered obviated.

Claims 1, 4, and 22-23 have been rejected as anticipated by Okui et al. These claims have been cancelled and, accordingly, this rejection is considered obviated.

Claims 2, 3, 5-6, and 13-16 have been rejected as unpatentable over Okui et al. and in further view of Inagaki et al. As stated above, these claims 2, 3, 5-6 and 13-16 have been cancelled and, accordingly, this rejection is considered obviated.

Claims 7-9 have been rejected as unpatentable over Okui et al. in view of Inagaki et al. and further in view of Akiyama et al. Claims 7-9 have been cancelled and, accordingly, this rejection is considered obviated.

Claim 19 has been rejected as unpatentable over Nakamura et al. in view of Falster et al. Claim 19 has been amended so that it now recites that method includes setting a carbon concentration to $1X10^{15}$ atoms per cm^3 or less for suppressing occurrence of the

dislocation clusters, thereby expanding the allowable range of the growth condition V/G in which range the defect-free crystal can be produced and then adjusting the growth condition V/G within the expanded allowable range. Thus, V/G is maintained so that no OSF region is present from a center of the plane up through 10mm from an outer periphery and an average void defect density from a center axis of a silicone wafer to 10mm from an outer periphery of a silicone wafer is not more than $5x10^6/cm^3$ and the average void defect size is not more than 10nm. This is not taught in either of Nakamura et al. or Falster et al., or their combination.

According to Falster et al., when carbon is present in a single crystal as an impurity, the concentration of carbon has the ability to catalyze the formation of oxygen precipitate nucleation centers.

On the other hand, Claim 19 as amended recites a method for manufacturing a defect-free crystal by growing a silicon ingot under an expanded acceptable~~allowable~~ range of the growth condition V/G in which defect-free crystals can be obtained, due to a dislocation cluster suppressing effect achieved by a carbon doping.

Thus, the invention of Claim 19 and the invention of Falster et al. obviously are different technical concepts and it would be impossible to reach the subject invention by combining Falster et al. and Nakamura et al.

Claim 21 has been rejected as unpatentable over Falster et al. in view of Moriya et al. Applicant has amended Claim 21 so that it now recites that there is a graphite crucible that covers an outside of the quartz crucible and that the heat shield is disposed above the quartz crucible and the graphite crucible. Further, the heat shield is positioned a distance of up to 30mm from the upper end of the heat shield and the inner wall of the single crystal pulling chamber which would thereby suppress the flow of CO gas to the melt. Further, the carbon concentration is set to 1×10^{15} atoms per cm^3 or less thereby

expanding the acceptable range of V/G. This is not found in either reference, Falster et al. or Moriya et al.

The subject invention in Claim 21 resolves the problem where, in the step of melting where CO gas is easily incorporated into the melt, the heat shield comes close to the inner wall of the single crystal pulling chamber to suppress the incorporation of CO gas into the melt, thereby lowering the carbon concentration in the crystal pulled up from the melt.

Here, a vertical movement of the heat shield is a technique common to both structures. However, in the invention in Claim 21, the distance between upper end of the heat shield and an inner wall of the single crystal pulling up chamber is controlled. This differs from Moriya et al. where the distance between a lower end and a melt surface is controlled, unlike the instant invention. Thus, the combination of Falster et al. and Moriya et al. cannot be combined to reach the subject invention as now claimed.

Applicant has added new claims 24 and 25 which conform to previously cancelled claims 17 and 18 with the exception that they have been amended to include that the V/G growth is maintained within the void defect region. This is not shown in the art of record.

Further, the inventions set forth in claims 24 and 25 are directed to a silicon wafer cut from a silicon single crystal in which growth condition V/G is controlled within a void defect region so as to make the average void defect density $5 \times 10^6/cm^3$ or less and an average void defect size 100nm or less.

Thus, the silicon wafer of claims 24 and 25 include void defects of no more than the predetermined density and size. On the other hand, Nakamura et al. discloses a method of preparing a defect-free crystal; thus, there is no defect in the silicon wafer of

Nakamura et al. and he could, therefore, not have a void defect region. As a result, it is believed that Nakamura et al. does not teach the same technical concept as recited in claims 24 and 25.

Applicant hereby requests reconsideration and reexamination thereof.

With the above amendments and remarks, this application is considered ready for allowance and applicant earnestly solicits an early notice of same. Should the Examiner be of the opinion that a telephone conference would expedite prosecution of the subject application, he is respectfully requested to call the undersigned at the below listed number,

Respectfully submitted,

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